Noninvasive dielectric sensor and technique for measuring polymer properties

Description of Technology: This invention relates to a sensor which allows dielectric measurements to be made in a completely non-obstructive manner on a fluid such as molten plastic flowing in a conduit. In particular, it relates to a ceramic cylinder with an interdigitated electrode capacitor patterned into the inside wall. The sensor may be used for continuous determination of copolymer composition and polymer viscosity (molecular weight) of material flowing in a conduit.

Patent Listing:

1. **US Patent No. 5,208,544**, Issued May 4,1993, "Noninvasive dielectric sensor and technique for measuring polymer properties"
   http://patft.uspto.gov/netacgi/nphParser?Sect2=PTO1&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&d=PALL&RefSrch=yes&Query=PN%2F5208544

Market Potential: The dielectric properties of any polymer are frequency and temperature dependent functions of the dipolar and ionic atomic and molecular polarization. As a material is subjected to an alternating electric field, polar groups and free ions move and orient along the field lines, causing a buildup of charge at electrode surfaces. From measurements of the electrical current associated with this excess charge, the capacitance and dissipation of the system are computed. Using the exact geometry of the sensing volume, the dielectric constant and dielectric loss factor may be calculated. Dielectric properties can be used to measure polymer properties of interest such as thermal transitions, epoxy curing rates, water and additive concentrations, and voids in the polymer.

Benefits:

- **Dielectric constant and dielectric loss factor may be calculated**

Applications:

- **Dielectric measurements**

Contact: Ken Anderson
Director, Entrepreneurial & Small Business Support, Delaware Economic Development Office (DEDO)
Carvel State Building, 820 French Street, Wilmington, DE, 19801
Phone: (302) 577-8496, Fax: (302) 577-8499, Email: Kenneth.R.Anderson@state.de.us